

Abstract Submitted
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**Navier-Stoke And MHD Turbulence Based Similarity Scaling
Criteria For Studying Astrophysics Using High Energy Density Labo-
ratory Experiments¹** YE ZHOU, LLNL, University of California —

The Euler similarity criteria for the laboratory experiment of astrophysics phenomena and the time-dependent mixing transition are important concepts introduced recently for the laboratory astrophysics. Nevertheless, the Euler scaling cannot consider the distinctive spectral range of high Reynolds number turbulent flows found in the astrophysics problems. The time-dependent mixing transition could not indicate whether a flow that has just passed the mixing transition is sufficient to capture all the physics of the important spectral range. In this presentation, a new approach, based on Navier-Stokes and MHD turbulence, is developed in order to consider the distinctive spectral scales associated with the high Reynolds number flows. The Reynolds numbers required to reproduce the most important spectral range of the astrophysical flows are determined. Finally, the implications of our theory in planning future laser experiments or simulations are discussed.

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